The listing of the claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended): Method for the production of an electro-optical printed circuit board (11), having a number of layers (24, 30) with electrically conductive elements (12), and at least one optical layer (13) with optically conductive elements (22), particularly with waveguides (22), ~~characterized in that~~ wherein the at least one optical layer (13) has a polysiloxane material, and that structuring of the elements (22) of the optical layer (13) takes place by means of casting ~~techniques,~~ into a casting mold (21) that contains the waveguide structures as a negative mold, whereby the mechanical connection between the optical layer (13) and the at least one layer (24, 30) of the electrically conductive printed circuit board layers is produced in direct connection with the production of the optical layer (13).

Claim 2 (Currently Amended): Method according to claim 1, ~~characterized in that~~ wherein the mechanical connection between the optical layer (13) and the at least one layer (24, 30) of the

electrically conductive printed circuit board layers is produced directly during the production of the elements (22) of the optical layer (13).

Claim 3 (Currently Amended): Method according to claim 2, ~~characterized in that~~ wherein the optical layer (13) is formed from a core polysiloxane (22) having a higher index of refraction, as well as a polysiloxane as a superstrate layer (23), having a low index of refraction, and a polysiloxane as a substrate layer (29), having a low index of refraction, in the form of cover layers on the core polysiloxane (22).

Claim 4 (Currently Amended): Method according to claim 3, ~~characterized in that~~ wherein the superstrate polysiloxane (23) is applied to the core polysiloxane (22), which has already solidified, in liquid form, brought into connection with a layer (24, 30) of the electrically conductive printed circuit board layers in its liquid phase, and subsequently cross-linked.

Claim 5 (Currently Amended): Method according to claim 3, ~~characterized in that~~ wherein the substrate polysiloxane (29) is applied to the core polysiloxane (22), which has already solidified, in liquid form, brought into connection with a layer

(30) of the electrically conductive printed circuit board layers in its liquid phase, and subsequently cross-linked.

Claim 6 (Currently Amended): Method according to ~~one of claims 4 or 5~~ claim 4, ~~characterized in that~~ wherein after cross-linking of the polysiloxane layer of the substrate (29) or the superstrate (23), the one layer (24) of the electrically conductive printed circuit board layers is mechanically fixed in place on the polysiloxane layer (23, 29).

Claim 7 (Currently Amended): Method according to ~~one of claims 3 to 6~~ claim 3, ~~characterized in that~~ wherein pit structures (34) of a casting mold (21) are filled with core polysiloxane (22) having a higher index of refraction, and hardened, in a first step; a polysiloxane having a low index of refraction is applied as a superstrate layer (23), in a second step, in such a manner that it bonds to the core polysiloxane (22); the superstrate layer (23) with the optically conductive elements (22) situated on it are separated from the casting mold (21), in a third step; and a polysiloxane having a low index of refraction is applied to the core polysiloxane (22) as a substrate layer (29), in a fourth step.

Claim 8 (Currently Amended): Method according to ~~one of claims 3 to 6~~ claim 3, ~~characterized in that~~ wherein the polysiloxane substrate (29) having the low index of refraction is produced by means of casting technology, with pit structures (34), in a first step; that a core polysiloxane (22) having a higher index of refraction is filled into the pits (34) in a second step; and that a polysiloxane having a low index of refraction is applied to the composite of polysiloxane substrate/core polysiloxane (29, 22) as a superstrate layer (23), in a third step.

Claim 9 (Currently Amended): Method according to ~~one of claims 3 to 8~~ claim 3, ~~characterized in that~~ wherein the layer (24, 30) of the electrically conductive printed circuit board layers has micro-structured spacers (25, 31) on the side facing the liquid polysiloxane of the substrate layer (29) or the superstrate layer (23), respectively, which guarantee a defined thickness of the substrate layer (29) or superstrate layer (23), respectively.

Claim 10 (Currently Amended): Method according to claim 1, ~~characterized in that~~ wherein the mechanical connection between the optical layer (13) and the at least one layer (24, 30) of the

electrically conductive printed circuit board layers is produced subsequent to production of the optical layer (13).

Claim 11 (Currently Amended): Method according to claim 10, ~~characterized in that~~ wherein the optical layer (13), consisting of polysiloxane substrate (29) and/or polysiloxane core (22) and/or polysiloxane superstrate (23), is first produced as an independent layer, and subsequently brought into mechanical connection with one or more layers (24, 30) of the electrically conductive printed circuit board layers either on one or both sides.

Claim 12 (Currently Amended): Method according to claim 11, ~~characterized in that~~ wherein the connection of the optical layer (13) with a layer (24, 30) of the electrically conductive printed circuit board layers is produced by means of lamination or gluing.

Claim 13 (Currently Amended): Method according to ~~one of the preceding claims~~ claim 1, ~~characterized in that~~ wherein the optically conductive layer (22) is handled jointly with the at least one layer (24, 30) of the electrically conductive printed circuit board layers during the production of the electro-optical

printed circuit board (11).

Claim 14 (Currently Amended): Method according to ~~one of the preceding claims~~ claim 1, ~~characterized in that~~ wherein the adhesion promoters are used to support the connection of the polysiloxane of the optical layer (13) with the layer (24, 30) of the electrically conductive printed circuit board layers.

Claim 15 (Currently Amended): Method according to claim 14, ~~characterized in that~~ wherein a polymer layer that adheres well to the layer (24, 30) of the electrically conductive printed circuit board layers is applied to the optical layer (13) as an adhesion promoter.

Claim 16 (Currently Amended): Method according to ~~one of claims 1 to 13~~ claim 1, ~~characterized in that~~ wherein a physical and/or chemical treatment of the surface of the layer (24, 30) of the electrically conductive printed circuit board layers, which layer is connected with the optical layer (13), is performed in order to achieve activation of the surface for improved adhesion to the optical layer (13).

Claim 17 (Currently Amended): Method according to claim 16,

~~characterized in that~~ wherein the layer (24, 30) of the electrically conductive printed circuit board layers that is mechanically connected with the optical layer (13) is influenced in its adhesion properties with regard to the optical layer (13) by means of flaming with gases.

Claim 18 (Currently Amended): Method according to claim 16, ~~characterized in that~~ wherein the layer (24, 30) of the electrically conductive printed circuit board layers that is mechanically connected with the optical layer (13) is influenced in its adhesion properties with regard to the optical layer (13) by means of plasma irradiation.

Claim 19 (Currently Amended): Method according to ~~one of the preceding claims~~ claim 1, ~~characterized in that~~ wherein the casting techniques for structuring the optically conductive elements (22) are carried out essentially at ambient temperatures.

Claim 20 (Currently Amended): Method according to ~~one of the preceding claims~~ claim 1, ~~characterized in that~~ wherein during casting of the optically conductive elements (22), the surface of the cast optically conductive elements (22) is drawn off by ductors and thereby the casting mold (21) is filled

completely.

Claim 21 (Currently Amended): Method according to ~~one of the preceding claims~~ claim 1, ~~characterized in that~~ wherein by means of the casting techniques for structuring the optically conductive elements (22), large-area structures of the optically conductive elements (22) can be produced.

Claim 22 (Currently Amended): Method according to ~~one of the preceding claims~~ claim 1, ~~characterized in that~~ wherein the polysiloxane material can be unmolded even from casting technology depressions (34) having very steep walls or depressions having undercuts, without impairment, because of its elastic properties.

Claim 23 (Currently Amended): Method according to ~~one of the preceding claims~~ claim 1, ~~characterized in that~~ wherein the coupling elements (14) for optical coupling of the optically conductive elements (22) to electrically conductive elements (15, 16, 17) of the electrically conductive printed circuit board layers (12) to be functionally connected are produced at the same time when the optical layer (13) having the optically conductive elements (22) is cast.

Claim 24 (Currently Amended): Method according to claim 23,

~~characterized in that~~ wherein the casting molds (34) for the optically conductive elements (22) possess beveled flanks at the ends (33), preferably at 45°; segments (28) of the optical layer that are molded on in the optical layer (13) are metallized locally (28) by means of these flanks (14) after unmolding, and then possess the function of integrated deflection mirrors (14).

Claim 25 (Currently Amended): Method according to ~~one of the preceding claims~~ claim 1, ~~characterized in that~~ wherein the optically conductive elements (22) of the optical layer (13) contain intersections, branches, mixers, wavelength multiplexers and wavelength de-multiplexers, and switching elements.

Claim 26 (Currently Amended): Method according to ~~one of the preceding claims~~ claim 1, ~~characterized in that~~ wherein the optically conductive layer (22) made of a polysiloxane material permits temperature stability of the optical layer of the electro-optical printed circuit board (11), for example during soldering processes up to essentially 250°C, without impairment of the optical properties of the elements (22) of the optical layer (13).

Claim 27 (Currently Amended): Method according to ~~one of the preceding claims~~ claim 1, ~~characterized in that~~ wherein the printed circuit boards (24) are formed from fiberglass-filled epoxy resin

and/or Kapton and/or Teflon and/or glass, which are not provided with electrically conductive layers (12) at all, or provided with them on one side or both sides.

Claim 28 (Currently Amended): Method according to ~~one of the preceding claims~~ claim 1, ~~characterized in that~~ wherein the printed circuit boards (24) used are provided with electrical conductor tracks (12) on one side or both sides.

Claim 29 (Currently Amended): Electro-optical printed circuit board (11) produced according to ~~one of the preceding claims~~ claim 1.

Claim 30 (Currently Amended): Use of an electro-optical printed circuit board (11) according to ~~one of the preceding claims~~ claim 1 in multi-layer boards, ~~characterized in that~~ wherein additional layers of the printed circuit board (11) or additional printed circuit boards (11) are added to a multi-layer composite, on one or on both sides of the composite of optical layer (13) and layers (24, 30) that are connected with the optical layer (13), produced according to the method.

Claim 31 (Currently Amended): Use of an electro-optical printed circuit board (11) according to claim 1 ~~to 29~~ as a line-

bound optical connection element, ~~characterized in that~~ wherein the composite of optical layer (13) and layers (24, 30) of the printed circuit board (11) connected with the optical layer (13), produced according to the method, is applied to a rigid carrier medium.

Claim 32 (Currently Amended): Use of an electro-optical printed circuit board (11) according to claim 1 ~~to 29~~ as a line-bound optical connection element, ~~characterized in that~~ wherein the composite of optical layer (13) and layers (24, 30) of the printed circuit board (11) connected with the optical layer (13), produced according to the method, is applied to a flexible carrier medium.

Claim 33 (Currently Amended): Use of an electro-optical printed circuit board according to claim 1 ~~to 29~~ as an integrated optical component, ~~characterized in that~~ wherein optical power splitters, optical mixers, optical switches, optical modulators, wavelength multiplexers, wavelength de-multiplexers, or optical attenuators are used as optical elements (22).